Exploring New Treatment Methods in Sports Related Concussions

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Background

Sports-related concussions (SRC) are one of the leading causes of injury in young athletes with over 400,000 diagnosed yearly. [1] These injuries can affect cognitive and emotional functions, cause sleep disturbances, and somatic symptoms which can impair an athlete's ability to play sports or perform in a classroom.

Purpose

The goal of this research is to provide a recommendation regarding the risks and benefits of prescribing exercise to young athletes after a sports-related concussion. This research will determine if it is reasonable to prescribe, if there are populations that should not receive this recommendation and identify any confounding factors that may affect recovery.

Design & Methods

•**Keywords:** Adolescent, Athletes, Athletic Injuries, aerobic exercise, Brain Concussion, concussion, cerebral concussion, exercise, exercise therapy, female, male, head injury, mild traumatic brain injury, muscle stretching exercise, post-concussion syndrome, prevention, recovery of function, rehabilitation, rest, sports.

•**Inclusion:** Subjects in trials were adolescents aged 13-21, Concussions were sports-related head injuries, diagnosis was formed within 10 days of the injury by a physician or review board, subjects were followed until resolution of symptoms and at least 1 week after, Subjects symptoms were monitored with an objective score.

•**Exclusion:** Injury was not sport-related, Study was performed before 2018, The study was not published in English, and the study was not performed in the United States or Canada.

PICOT

In adolescents and young adults suffering from SRC, does initial aerobic exercise management shorten recovery time compared to rest?

Summary of Evidence Search:

Database	Yielded	Included in Analysis
Google Scholar	780	2
Valpo Summon	310	3
PubMed	139	1
Total:	1,229	6

Types of Studies

After applying the inclusion and exclusion criteria, six studies were selected. 1 Quasi-experimental design, 2 randomized controlled trials, 1 secondary analysis of a RCT, 1 retrospective cohort study, and one systematic review.

Results:

- All studies used the Buffalo Concussion Treadmill Test to evaluate the subjects therapeutic heart rates.
- Subthreshold exercise had faster recovery times and return to sport compared to rest or stretching without heart rate elevation.
- Onset of exercise within the first 24 hours showed to have the strongest effect.
- Patients with higher severity of concussions were more adherent.
- Delayed Recovery was more prevalent in placebo groups and rest groups.
- The use of screens and high cognitive demands slowed recovery and increased symptoms in patients.

Days to recovery

Author	Physical Activity	Placebo-Like Stretching	Rest
Willer et al.[2]	13	17	16
Leddy et al.[3]	13.04		28.43
Leddy et al.[4]	13		17
Leddy at al.[5]	8.29	23.93	
Leddy at al.[5]	13	17	
Leddy at al.[5]	14	19	
Leddy at al.[5]	10.5		16
Leddy at al.[5]	15.6		24.2

References:

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5. Leddy JJ, Burma JS, Toomey CM, et al. Rest and exercise early after sport-related concussion: a systematic review and meta-analysis. *Br J Sports Med*. 2023;57(12):762-770. doi:10.1136/bjsports-2022-106676

Best Practice

Subthreshold exercise should be recommended as first line therapy for athletes who suffer a SRC soon after their injury.

Exercise should not induce or worsen symptoms of concussion and should not put the patient at risk for another head injury.

Screen time and abrupt increase in cognitive activity worsen time to recovery and increase symptom severity.

LOC and previous number of concussions are risk factors for more severe symptoms and longer recovery.

HR management may be hard to follow in clinical practice.

Limitations:

There were no long-term analysis of outcomes/adverse events in the exercise patients. Many of the same authors conducted most of the research on this topic in the United States and Canada, meaning any author bias is confounded throughout this study. This study is limited to adolescents who sustained a sport-related concussion and is not generalizable to the entire adult population, especially if a person is not already exercising regularly, or sustained a sport-related mechanism.

Further study:

Future research should focus on long-term outcomes comparing recurrence rates, persistent symptoms, and post-concussion syndrome. Likewise, more multi-centered, large, randomized control trials should be performed to confirm these results. Finally, more studies should compare the amount of time exercising and the intensity of exercise to create stronger guidelines.

Conclusion:

Subthreshold aerobic exercise is a useful tool for the management of acute SRC in young adults and adolescents. It can help shorten recovery times and time to return to sport. It should be initiated as soon as possible after SRC for the best results. Clinicians should recommend objective ways for patients to monitor HR, symptom exacerbation, and prevent additional injuries during exercises.

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